PB-217 944

WATER QUALITY SURVEY IN THE JAMES AND MAURY RIVERS, GLASGOW, VIRGINIA, SEPTEMBER 1967

Federal Water Pollution Control Administration
Annapolis, Maryland

April 1968

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

157

PB 217 944

WATER QUALITY SURVEY
IN THE
JAMES AND MAURY RIVERS
GLASGOW, VIRGINIA
SEPTEMBER 1967

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. Department of Commerce
Springfield VA 22151

CB-SRBP Working Document Number 27
Chesapeake Field Station
FWPCA
Middle Atlantic Region
April 1968

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
II.	PROCEDURE	2
	A. Sampling	2
	B. Chemical Analysis	2
III.	STATION DESCRIPTIONS	5
IV.	SURVEY RESULTS	6

I

I. INTRODUCTION

The Chesapeake Field Station of the Middle Atlantic Region, Federal Water Pollution Control Administration, conducted an intensive survey of the James and Maury Rivers in the vicinity of Glasgow, Virginia during September 1967 (see Figure 1). The purpose of this survey was to measure the effects of reported high organic loadings on these two rivers in the vicinity of their confluence and to determine pesticide levels in an area with a reported massive fish kill.

II. PROCEDURE

A. Sampling

Top samples for all stations were obtained by dipping a plastic container full of the stream water. Bottom water samples for Stations 3 and 4 were obtained at a depth of five feet above the bottom of the river using a Van Dorn sampler. For all stations a gallon cubitainer was filled from the sampling container. A portion of the sample was siphoned into a DO bottle until overflowing and fixed. A portion of the sample was also used to measure the pH and temperature at the time of sampling. All samples were returned to the camper laboratory within two hours where the analyses were started immediately. A total of six sampling runs was made. On two of the sampling runs, on different days, special samples were taken for pesticide analysis. These samples were obtained at Stations 1, 2, 3, 4, and 6 by dipping a one quart glass bottle full. The samples for pesticide were sealed and sent to the Robert A. Taft Sanitary Engineering Center for analysis.

B. Chemical Analysis

1. Dissolved Oxygen

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

Dissolved oxygen was determined by the azide modification of the basic Winkler method with the titration done potentiometrically with an automatic TITRALYZER.

2. Biochemical Oxygen Demand

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

The biochemical oxygen demand was determined by the azide modification of the basic Winkler method with the titration done potentiometrically with an automatic TITRALYZER. The samples as received were diluted if necessary and transferred to standard 300 ml BOD bottles in triplicate. One initial DO and two final DO determinations were used throughout. Incubation was started immediately at 20°C and continued for five days after which they were titrated.

3. pH

The pH measurements were made at the sampling point with a field pH meter.

4. Color

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

The color of the samples was determined by visual comparison with solutions of known concentrations of potassium chloroplatinate. The samples as received were centrifuged to remove all turbidity present. The visual comparison was then made using equal volumes of sample and standards in nessler tube.

5. Filtrable Residue

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

The filtrable residue was determined by evaporating to dryness a known volume of sample that has been millipore filtered. The evaporation was done by using a tared evaporating dish as a carrier. The drying oven was maintained at 105°C. When the evaporation of the sample was complete, the dishes were cooled and weighed. The gain in weight represented filtrable residue.

6. Turbidity

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

The turbidity of the sample was determined by using a turbidimeter. A portion of the sample was transferred to a curette and inserted in place in the turbidimeter and read directly in Jackson Turbidity Units.

III. STATION DESCRIPTIONS

Number	Station	Location
1	Maury River	One hundred yards upstream from James Lee outfall
2	Maury River	Near public ramp below Va. Rt. 249 Bridge
3	James River	Approximately one-half mile upstream from Maury River confluence
4	James River	One hundred yards upstream from Balcony Falls Dam
5	James River	Below spillway of Balcony Falls Dam
6	James River	U. S. Rt. 501 Bridge
7	Maury River	South Buena Vista Bridge below STP
8	Maury River	Goose Neck Dam

IV. SURVEY RESULTS

JAMES AND MAURY RIVERS

Sample Number	Date Sample Taken	Time Sample Taken	Field Temp °C	DO mg/l	Field pH	BOD mg/l	Color Units	Diss. Solids mg/l	Turbidity JTU	Pesticides ug/l
		Station 1 - Maury - upstream James Lee outfall								
67091801	9-13	1150	16	10.66	7.4	2.30	35	215	8.5	N D
11		1555	20	11.35	7	2.65	30	233	6.5	
21	9-14	0850	16	8.49	7	2.47	25	237	7	
31		1215	17.5	9.95	6.85	2.54	30	214	7	
41		1715	20.5	11.27	6.8	2.56	25	211	4	
51	9-15	0915	15.5	8.70	6.8	1.86	20	241	4.5	N D
		Station 2 - Maury - below Va. Rt. 249 Bridge								
67091802	9-13	1040	16	8.02	7.35	5.92	25	492	6.5	0.411
12		1450	19	9.00	6.9	4.34	30	254	5.5	
22	9-14	1055	17	8.16	7	4.74	30	242	6	
32		1445	20	8.94	7	4.08	35	214	5	
42		1850	18	10.94	6.8	5.76	25	232	6.5	
52	9-15	1105	17	7.89	7	3.86	25	230	5.5	0.385
		Station 3 - James - upstream Maury River confluence								
67091803*	9-13	0935	19	9.07	6.7	2.22	55	281	2	N D
13*		1400	18.5	8.83	7.1	1.25	40	306	2.5	
23*	9-14	1015	18	9.11	6.9	1.37	35	280	2	
33*		1405	21	9.09	7.1	1.09	35	260	2.5	
43*		1815	20.5	9.54	6.9	1.70	25	258	2	
53*	9-15	1030	19	9.11	7.2	1.02	25	314	2	0.017
04**	9-13	0935	18	9.14	-	3.74	35	287	3.5	
14**		1400	17.5	8.27	-	1.25	45	310	3.5	
24**	9-14	1015	17.5	9.15	-	0.88	35	269	2.5	
34**		1405	20.5	9.25	-	1.49	40	247	3.5	
44**		1815	19.5	8.58	-	1.31	30	267	4	
54**	9-15	1030	18.5	9.20	-	1.18	30	306	2.5	

* Top 5'

** Bottom 15'

N D None detectable

Sample Number	Date Sample Taken	Time Sample Taken	Field Temp °C	DO mg/l	Field pH	BOD mg/l	Color Units	Diss. Solids mg/l	Turbidity JTU	Pesticides ug/l
		Station 4 - James - upstream Balcony Falls Dam								
67091805*	9-13	1000	18.5	8.41	6.7	2.96	30	280	5	0.034
15*		1420	18.5	7.40	6.9	1.31	40	297	3.5	
25*	9-14	1030	18	8.50	7	1.68	40	275	3.5	
35*		1425	20.5	9.29	7.3	2.27	45	256	2	
45*		1830	19.5	9.72	7	2.06	25	268	2.5	
55*	9-15	1045	19	8.57	7.1	1.94	40	285	3.5	0.125
06**	9-13	1000	17	7.92	-	3.32	35	227	16.5	
16**		1420	17.5	8.34	-	1.54	20	268	14	
26**	9-14	1030	17	7.69	-	2.44	35	241	7.5	
36**		1425	19	7.81	-	3.03	45	236	7	
46**		1830	18.5	9.60	-	3.18	30	239	6.5	
56**	9-15	1045	18.5	7.39	-	3.14	30	235	7.5	
		Station 5 - James - below Balcony Falls Dam								
67091807	9-13	1030	17	8.87	7	5.00	40	287	11	
17		1425	21	8.47	7.1	2.15	30	293	6.5	
27	9-14	1030	18	7.39	7.1	2.28	30	266	8	
37		1435	19.5	8.98	7	2.40	40	271	4.5	
47		1840	19	9.09	6.9	3.35	25	264	9	
57	9-15	1055	18	9.05	7.3	2.47	30	277	4.5	

* Top 5'
** Bottom 15'

Sample Number	Date Sample Taken	Time Sample Taken	Field Temp °C	DO mg/l	Field pH	BOD mg/l	Color Units	Diss. Solids mg/l	Turbidity JTU	Pesticides ug/l
		Station 6 - James - U.S. Rt. 501 Bridge								
67091808	9-13	1130	19.5	10.00	7.4	5.26	50	279	4.5	0.230
18		1525	20	9.09	6.9	1.92	30	288	4.5	
28	9-14	0815	18	9.57	7.1	2.01	50	293	4.5	
38		1235	20	9.87	6.8	2.19	50	307	4	
48		1630	20	8.91	6.8	2.47	35	291	4.5	
58	9-15	0940	18	10.14	6.8	2.02	35	249	4.5	0.177
		Station 7 - Maury - south Buena Vista Bridge below STP								
67091809	9-13	1230	17	8.12	7.3	4.56	35	213	7.5	
19		1620	19.5	8.77	7	2.56	20	252	6.5	
29	9-14	0735	16	8.11	7	2.30	30	220	8.5	
39		1200	18	8.29	6.8	2.13	40	240	6	
49		1655	22	9.19	6.9	6.29	30	241	5	
59	9-15	0855	16	8.86	6.8	2.43	30	207	7.5	
		Station 8 - Maury - Goose Neck Dam								
67091810	9-13	1210	16	9.95	7.25	3.44	30	221	6	
20		1635	19	10.00	6.9	3.49	25	224	9.5	
30	9-14	0710	16	8.50	7	1.86	25	213	7	
40		1145	17	9.87	6.8	2.26	30	242	7	
50		1640	19.5	10.98	7	2.85	20	219	5.5	
60	9-15	0830	16	8.45	6.8	3.43	30	202	11	

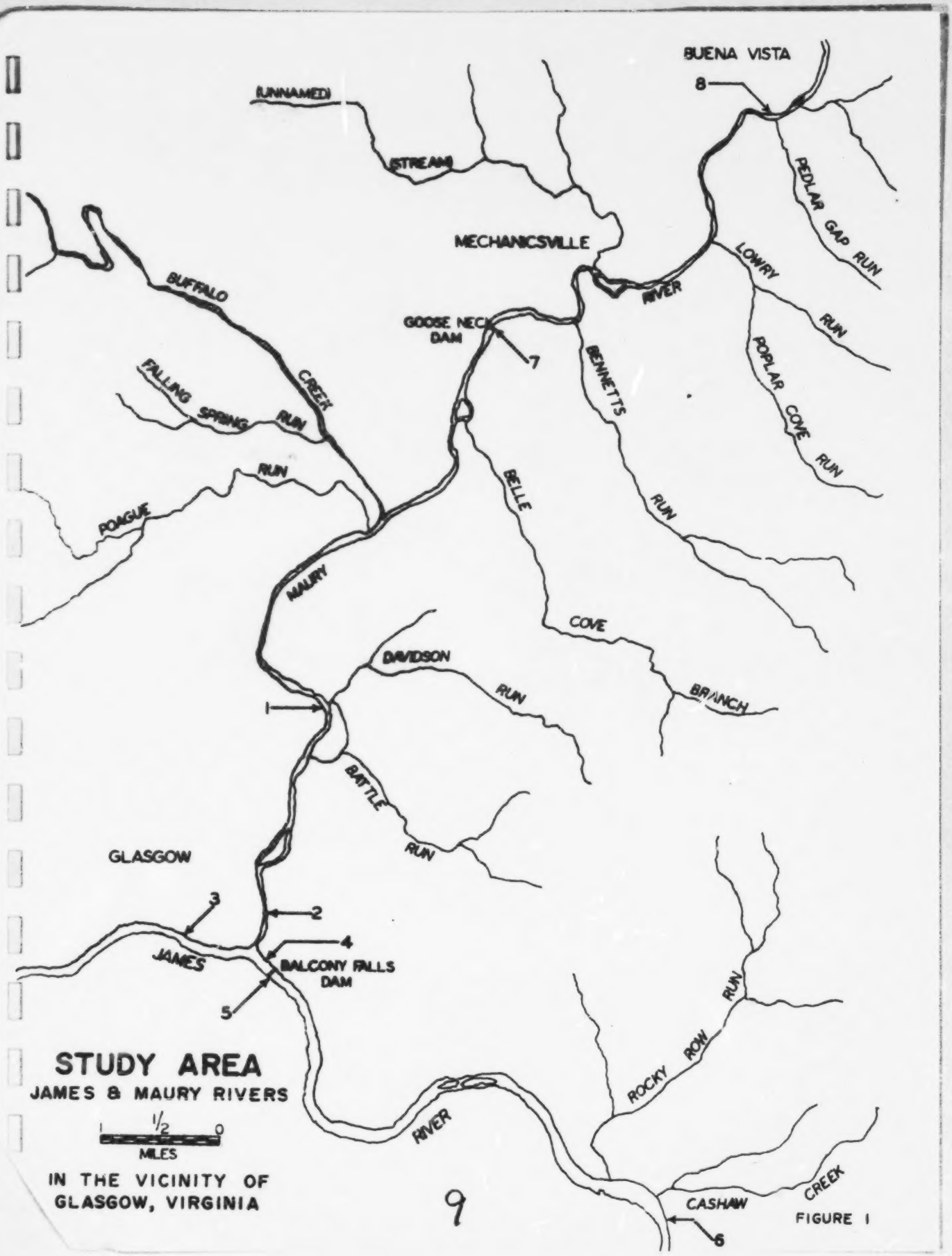
BUENA VISTA
8
UNNAMED
STREAM
MECHANICSVILLE
PEDLAR GAP RUN
LOWRY RUN
RIVER
BUFFALO CREEK
GOOSE NECK DAM
7
BENNETTS RUN
POPLAR COVE RUN
FALLING SPRING RUN
RUN
POAGUE RUN
BELLE COVE BRANCH
MAURY
DAVIDSON RUN
1
BATTLE RUN
GLASGOW
3
2
4
JAMES
BALCONY FALLS DAM
5
ROCKY ROW RUN
RIVER
CASHAW CREEK
6
STUDY AREA
JAMES & MAURY RIVERS
1/2
0
MILES
IN THE VICINITY OF
GLASGOW, VIRGINIA

FIGURE 1